

### Claims

What is claimed is:

- 5           1.     A magnetic memory device comprising one or more free magnetic layers, the one or more free magnetic layers comprising a low magnetization material adapted to have a saturation magnetization of less than or equal to about 600 electromagnetic units per cubic centimeter.
- 10           2.     The device of claim 1, configured such that a ratio of mean switching field associated with an array of non-interacting magnetic memory devices and a standard deviation of the switching field is greater than or equal to about 20.
3.     The device of claim 1, further comprising at least one non-magnetic layer  
15    between the one or more free magnetic layers.
4.     The device of claim 1, wherein the low magnetization material has a saturation magnetization of less than or equal to about 500 electromagnetic units per cubic centimeter.
- 20           5.     The device of claim 2, wherein the ratio is dependent on a thickness of the one or more free <sup>magnetic</sup> layers.
6.     The device of claim 1, wherein the one or more free layers exhibit an  
25    anisotropy of less than or equal to about 20 oersteds.

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7. The device of claim 1, wherein the one or more free <sup>magnetic</sup> layers exhibit an anisotropy of greater than or equal to about 20 oersteds.

8. The device of claim 1, wherein the low magnetization material comprises  
5 a nickel-iron alloy.

9. The device of claim 1, wherein the low magnetization material is adapted  
to have a saturation magnetization of less than or equal to about 600 electromagnetic  
units per cubic centimeter by inclusion of a moment-reducing element into the low  
10 magnetization material.

10. The device of claim 9, wherein the moment-reducing element is selected  
from the group consisting of germanium, boron, vanadium, molybdenum, osmium and  
combinations comprising at least one of the foregoing elements.  
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11. The device of claim 1, having a switching field of less than or equal to  
about 120 oersteds.

12. The device of claim 1, having a switching field of less than or equal to  
20 about 60 oersteds.

13. A method of producing a magnetic memory device having one or more  
free magnetic layers comprises the step of tuning the saturation magnetization of the one  
or more free magnetic layers to have a saturation magnetization of less than or equal to  
25 about 600 electromagnetic units per cubic centimeter.